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ABSTRACT

This study investigated (1) the amount of time mothers spend with preschoolers in specific activities related to cognitive development and the level of intensity of contact shared between mother and child during these activities; (2) sociodemographic variables which influence mothers' time spent with children; and (3) relations between mothers' time spent with children and multiple measures of cognitive development and school-readiness skills in children measured independently. The sample consisted of 93 middle class children aged 54 to 71 months and their mothers. The children were tested in their schools with a multiple battery of tasks tapping pre-achievement skills, learning and memory skills, intelligence and individual personality differences relevant to problem solving. In addition, teachers were asked to rate the children's cognitive abilities, classroom skills and personal-social skills. Information about the amount and nature of time the mothers spent with their children was obtained using an interview schedule and a daily diary instrument. Results are presented for (1) effects of different levels of maternal education, number of hours a mother worked per week, child's age, and child's sex on the amount of time mothers reported spending with their preschool children at various levels of contact and in various activities during the day; and (2) effects of maternal time and education on children's preschool performance. (JMB)

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MATERNAL TIME USE AND PRESCHOOL PERFORMANCE

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Introduction

The influence of home environment variables on children's intellectual development and academic achievement has been the focus of extensive study in child development research. Until recently, the home environment has most often been assessed with global measures including social class (Hess, 1970), parental absence (Biller, 1974; Yarrow, 1963), working status of the mother (Hoffman, 1974) and child-rearing attitudes of parents (Bayley & Schafer, 1964).

Currently, researchers argue that these categories are too global. Instead it has been suggested that attention be focused on the description and analysis of more specific events shared between parents and children which mediate the effects of such global variables and contribute to the differences found in children's cognitive functioning (Schoggen & Schoggen, 1971: White & Watts, 1973). In addition, there are two other criticisms of previous studies: 1) Only limited measures of cognitive assessment (e.g., IQ) have been utilized and 2) Collection of test data and assessment of the home environment have been separated by a significant period of time.

Psychological research and current popular writing (Boucock, Newsweek, October 1975) have suggested that the amount of time children spend in activities with their parents contributes importantly to the quality of young children's lives in general, and to children's cognitive development and academic

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achievement in particular. In spite of the strength of these beliefs held by many people, surprisingly little data are available which can provide information about the particular variables with influence time spent with children and the affects of time on children's development. Furthermore, when current research studies have identified mother-child interaction variables important for children's intellectual development and academic achievement, the degree to which children come into contact with these types of interaction in their everyday lives is often not the topic of study. Barker and Wright (1954) stated the problem many years ago: "In short, we know how people behave under the conditions of experiments and clinical procedures, but we know little about the distribution of these procedures outside of laboratories and clinics (p. 2)."

The Study

To resolve some of these problems, a study was designed to investigate 1) amount of time mothers spend with preschoolers in specific activities related to cognitive development and the level of intensity of contact shared between mother and child during these activities; 2) sociodemographic variables (including sex and age of child and working status and education of mother) which influence mothers' time spent with children; and 3) relations between mothers' time spent with children and multiple measures of cognitive development and school-readiness skills in children measured independently.

Various exploratory measures were used, within the framework of a home interview, to investigate the actual amount of time spent with a pre-school child, and also to examine certain parameters that might be importantly related to quantity of time invested in the child. (For a detailed investigation of the method of study, especially a comparison of the several different techniques sampled for measuring amount of time mothers spent in certain activities with

their children see Goldberg, R. & Na[illegible]ali, D. "Time use methodology for child care" in preparation for the Institute of Social Research Monograph Series, Ann Arbor, Michigan.) Mothers were interviewed because they spend significantly more time with their children, on the average, and also because they were more easily accessible for a lengthy interview.

Sample

The sample consisted of 93 children and their mothers. The children (49 boys and 44 girls) ranged in age from 54 to 71 months, with a mean age of 63 months or five years, three months. All children were attending four nursery schools and four day-care centers expected to begin kindergarten in the Fall of 1975. They were from middle-class families residing in the Minneapolis metropolitan area.

The mothers' average age was 30.4 years. They had an average equivalent of two years post-high school education, with a broad range in education of 8 to 17 years. All but six were high school graduates and 33 were college graduates. About two-thirds of the mothers worked and the remaining one-third were housewives. Of the working mothers, one-half were employed full-time. Eighteen of the mothers were single parents. See Table 1 for descriptive characteristics of the sample.

Insert Table 1 here

Procedure and Measures

Children were tested in their schools with a multiple battery of tasks tapping pre-achievement skills, learning and memory skills, intelligence and individual differences in personality relevant for problem solving. The tasks were derived from learning and cognitive measures commonly used in laboratory

studies and psychometric batteries. All but two of the tasks had been used in previous longitudinal studies conducted by the author and recently reported by Stevenson, et al. (1976a). They were found to be appropriate for this age group and significantly related to academic achievement in later grades. Teachers rated the children's cognitive abilities, classroom skills and personal-social skills. These ratings had also been used in the longitudinal work mentioned above, and several were found to be highly predictive of achievement in K-3rd grade (Stevenson, et al., 1976b). A complete list of the tasks and teacher ratings can be found in table 2.

Insert Table 2 here

An interview schedule and daily-diary instrument were developed to obtain information about the amount of time mothers spent in a week with their children (maternal time) in the following activities: 1) teaching, 2) reading, 3) preparation for kindergarten, 4) watching television and 5) social activities which included (playing with the child, eating with the child, putting the child to bed, and taking the child on an outing. In addition, mothers' daily diary schedules were coded for three levels of intensity of contact shared between mother and child across activities during a week: 1) Direct time (exclusive, one-to-one contact); 2) Indirect time (non-exclusive but semi-focused contact) and; 3) Available time (mother and child were within shouting distance.)

The interview took approximately 1-1/2 hours and consisted of many types of questions (time spent with children; organization of routine household activities; degree of planning for activities in home; how household and child care responsibilities were divided between husbands and wives; and detailed information about family meals. Only a subset will be discussed today, including two kinds of maternal time data.

First, the general time measures were obtained in the following manner. Each mother was asked to say what she was doing, what her pre-school child was doing, and who the child was with, from the time she got up in the morning to the time she went to bed, for the preceding weekday and Sunday. The time mother's spent with children during the day was coded for three levels of contact. The first was labeled "direct" time and included time spent in one-to-one contact with the child. The third was "available" time and included those times when mother was only within calling distance of the child. The second, "indirect" time, was between these two and included times when mother and child were doing different things in the same room and periodically involved with one another. A weekly estimate for each of the three diary measures was computed by summing five times the weekday measure and two times the Sunday measure.

The second kind of measures were estimates of time in specific activities. Each mother was asked about the duration of the last occurrence of eight different interaction situations with her preschooler. She was then asked how often such interactions occurred each week. A weekly estimate of time in each situation was computed by multiplying the duration of the last instance by the frequency per week. The measures represented time spent by the mother with the child in: reading to the child; teaching the child something other than schoolwork; preparing the child for kindergarten; playing with the child; eating with the child; putting the child to bed; and going on an outing with the child. A summary of social activities was derived, that is, the sum of time spent together in: play, mealtime, bedtime and outing. Mother's reports of duration and frequency of activities were based on the events occurring the day or week immediately preceding the interview. It must be remembered that these are estimates made by mothers, not actual observed time.

Each mother reported her own and her husband's occupation and educational background, her working status, and the ages and sexes of all persons in the household. The time measures, tasks, and teacher ratings are listed in Table 2.

Summary of Results

Maternal time

Considering first the descriptive information about maternal time, the first important finding was the striking variability in the amount of time mothers reported spending with their preschool children at various levels of contact and in various activities during the day. This was true even though the sample represented a rather homogenous group based on socioeconomic status and mothers' level of education. The actual allocation of time to different activities was the second finding of interest. Preschool age children were found to spend little time in direct contact with their mothers; mothers reported spending slightly more than one hour a day in one-to-one contact with their children, the least amount of time was devoted to this activity during the week. Television occupied more time than teaching and reading activities combined. The results also indicated that mothers spent much more time with their children in social activities, including outings in the care than in specific educational activities (3 times as much).

Maternal variables, including mothers' education and the number of hours a mother worked per week, proved to have the most numerous effects upon mothers' allocation of time to children, whereas children's age and sex had very little effect. For example, as can be seen in Figure 1 in your handout, more highly educated mothers spent more time reading to their children and in indirect contact

Insert Figure 1 here

contact with them. Mothers spent the same amount of time with boys and girls,

except for indirect time of which they spent more with girls. Mother's time spent with girls was more variable except for direct time and k-preparation.

A most unexpected result of the study indicated that mothers who worked full-time had the same amount of direct, one-to-one contact time with children reported in their diaries as mothers who did not work at all. Full-time working mothers had less available and indirect time to devote to their children, however. The data for indirect and available time are graphed in Figure 2.

Insert Figure 2 here

It is suggested that mothers who stay home with their children are not necessarily giving their children any more one-to-one contact than mothers who are separated from their children all day because they are employed. Staying home to "take care of" children, as is evident in these data, does not necessarily mean being engaged with children in one-to-one contact.

Single mothers like non-working mothers were found to have more direct contact and less indirect and available contact with their children than married mothers, but no differences were found for time in specific activities. Because all of the single mothers worked part-time or full-time, it was suggested that the relation to time allocation was more a function of mothers' working status than marital status.

Maternal Time and Preschool Performance

Analysis of the independent effects of mothers' time and mothers' education showed that the variance in children's performance was explained more effectively by mothers' education than time. In addition, specific patterns were found for tasks tapping related skills; mothers' education was the significant variable for all tasks tapping verbal skills, whereas time was the

significant variable for only non-verbal tasks. Maternal time appeared to affect cognitive skills differently which supported previous research relating different home environment variables to different cognitive skills (Marjoribanks, 1972; Jones, 1972; Bing, 1963).

In contrast to performance on verbal or non-verbal tasks, a specific and consistent interaction between mothers' time spent in education related activities with their children and mothers' own education level was found for reading achievement, arithmetic achievement and personal style in solving problems. This interaction effect is graphed in Figure 5 for Reading Achievement and maternal time in teaching activities.

Insert Figure 5 here

The pattern of interaction effects across these tasks may be summarized in the following manner: children of high education mothers did better on the measures when their mothers reported spending more time teaching them things or in activities preparatory for kindergarten, whereas children of low education mothers did more poorly on the measures when mothers reported spending more time in the same activities.

Furthermore, more time spent being taught by high education mothers, as opposed to low education mothers, appeared to prepare children not only for acceleration in specific skills like reading, but generalized to other learning situations in the classroom. Evidence for this generalization comes from the analysis of the teacher rating data in which the same interaction effect mentioned above was found for mothers' time spent in educational activities with their children and children's ratings on comprehension of class discussions, verbalizing ability in the classroom, cooperation in school activities and interest in the educational

environment of the classroom. This may suggest that maternal time allocation reflects mothers' attitudes toward learning which more or less prepares children to function in school and take advantage of the learning environment as much as maternal time allocation serves to influence children's cognitive abilities per se. This is not unlike Hess and Shipman's (1965) argument that parents transmit attitudes about learning to their children through specific interactions with them and that these generalize to and affect children's response to learning situations.

In addition, a relationship was demonstrated between large quantities of low intensity (Available Contact time) interaction and children's lack of interest in their surroundings. This suggests that stimulating contact with mother on a day to day basis may influence children's motivation to seek stimulation at school.

The results have been discussed in terms of: 1) mothers' education as a determinant of quality of stimulation provided and effectiveness of teaching techniques; 2) children's demands on mothers for contact and mothers' perceptions of their children's abilities; 3) children's capability to learn versus their opportunity to learn, and 4) mother's accuracy in reporting time-use information.

Finally, the data suggest that more educated mothers either (1) spend time with their children that is more stimulating and of a higher quality intellectually, or (2) have brighter children or (3) both. The direction of the effect cannot be determined by this study. Further research needs to explore, in greater detail, the differences in how time is spent by mothers of different levels of education, and the intellectual level of children needs to be controlled more carefully.

It has become obvious from this study that mothers' allocation of time to children involves a complicated interaction of individual differences in mothers, in children and in family status variables. Time is viewed and reported to be allocated differently for high versus low education mothers and working versus non-working mothers. Time also relates to various cognitive and academic outcome measures in interaction with family economic and maternal education variables. It is clear that these variables need to be looked at carefully when considering allocation of time to child care and the effects of time on children's cognitive skills. Therefore, for future research, it would be important to increase the sample size systematically to select groups based on mothers' education and working status, maternal time and children's intellectual and cognitive characteristics.

The reliability of mothers' time estimates with this method needs further study. It would be important, for example, to conduct observational studies of mothers' time allocation and compare these with mothers' reports of time similar to that done by Douglas et al. (1968). Data of one type are available from the present study although not analyzed; the amount of time spent in direct activities with children coded from the diaries. This information should be compared to mothers' estimates of time spent in similar activities with the same children.

The lack of great numbers of relations between maternal time and children's cognitive abilities found in this study of four and five-year-olds does not preclude the possibility that effects may be more prevalent at an earlier age. Certainly many investigators (White & Watts, 1973) would suggest that the crucial time for the influence of mother-child interaction is before three years of age. Likewise maternal time may have different effects on school performance later

on. Longitudinal study of maternal time and performance would indicate the changing effects of time on performance at different ages for the same children and mothers.

This study has brought us a little closer to understanding the influences of maternal time on children's development. In some ways, it raised more questions than provided answers. Findings and interpretations are as yet speculative due to some limitations of the data available and shortcomings of the methodology. However, adopting time use information as an index of the influence of the home environment on children's cognitive development has proved to be a method of interest, and one with potential for future research.

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TABLE 1

Descriptive Characteristics of Subjects

Item	Boys	Girls	Total
Number	49	44	93
Age in months			
Mean	62.6	62.7	62.7
Range	54-71	56-69	54-71
Birth order			
1st	19	9	28
2nd	15	12	27
3rd or greater	15	23	48
No. of siblings			
0	18	9	27
1	22	19	41
2 or more	9	16	25
Started nursery school			
Mean (months)	38.0	44.5	41
Range	10-65	3-63	3-65
Yrs. nursery school	1.6	1.0	1.5
Mother's ed. (yrs.)			
Mean	14.4	13.8	14.1
Range	10-16	9-16	9-17
Mother's marital status			
Married	39	36	75
Single	10	8	18
Mother's working status			
Non-working	12	13	25
Part-time	15	16	31
Full-time	22	15	37
Father's ed. (yrs.)			
Mean	14.9	15.0	14.9
Range	8-17	10-17	8-17
Father's occupation			
Mean	4.2	4.3	4.2
Range	2-5	2-5	2-5

Table 2

List of Maternal Time and Performance Measures

TIME MEASURES

GENERAL TIME
- Direct
- Indirect
- Available

SPECIFIC ACTIVITY TIME
- Teaching
- Reading
- K-preparation
- Social sum (sum of playing, going on outings, bedtime and eating)

TV WITH CHILD

PERFORMANCE MEASURES

TASKS
- Achievement
  - Reading (WRAT)
  - Arithmetic (WRAT)
- Intellectual
  - Vocabulary (WPPSI)
  - Block Design (WPPSI)
- Cognitive
  - Verbal recall
  - Concept learning
  - Perceptual learning
  - Observational learning
- Individual difference measures
  - Self reliance
  - Aspiration
  - Problem-solving style

TEACHER RATINGS
- Cognitive abilities
  - Effective learner
  - Retaining information
  - Comprehension
  - Verbalizing Ability
- Classroom Skills
  - Attention
  - Following instructions
  - New activities
  - Persistence
  - Organization
- Personal-social Skills
  - Social acceptance
  - Cooperation
  - Self reliance
  - Curiosity

FIGURE 1

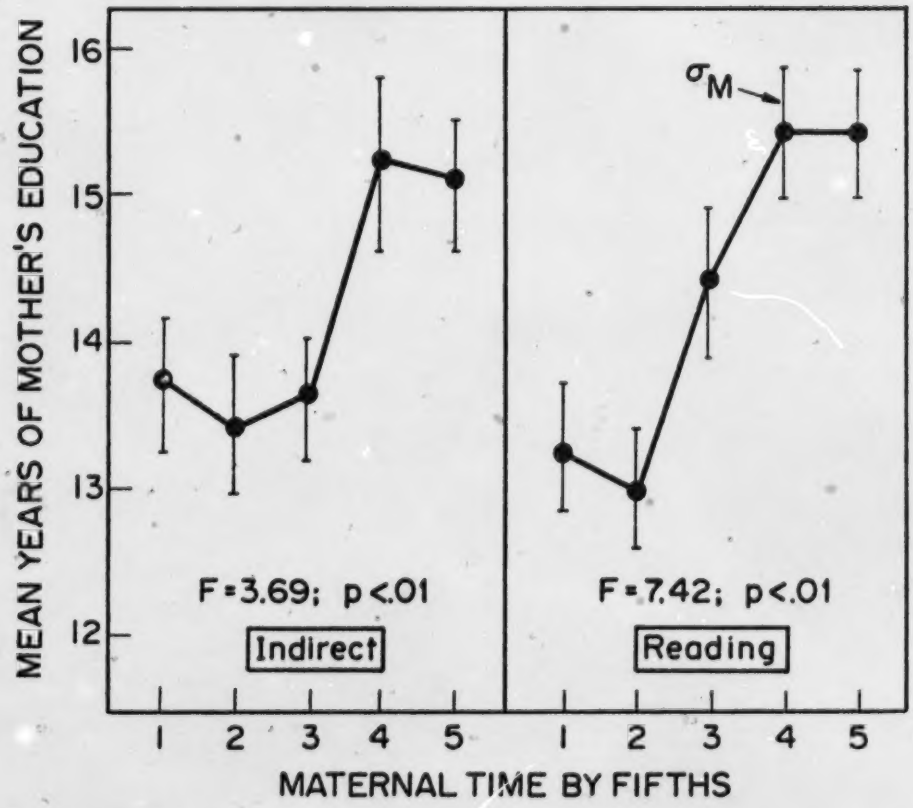

MEAN YEARS OF MOTHER'S EDUCATION
16
15
14
13
12
σ_M
F=3.69; p<.01
Indirect
F=7.42; p<.01
Reading
1 2 3 4 5
1 2 3 4 5
MATERNAL TIME BY FIFTHS

FIGURE 2

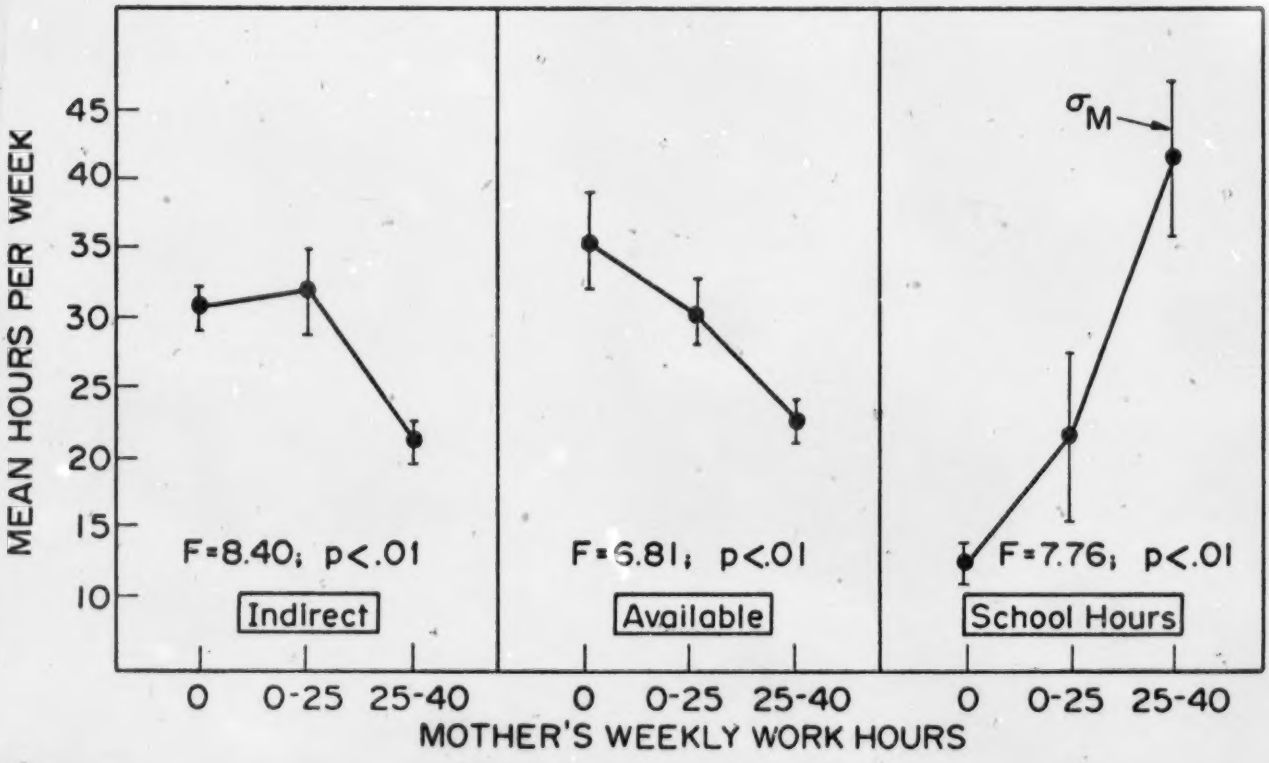
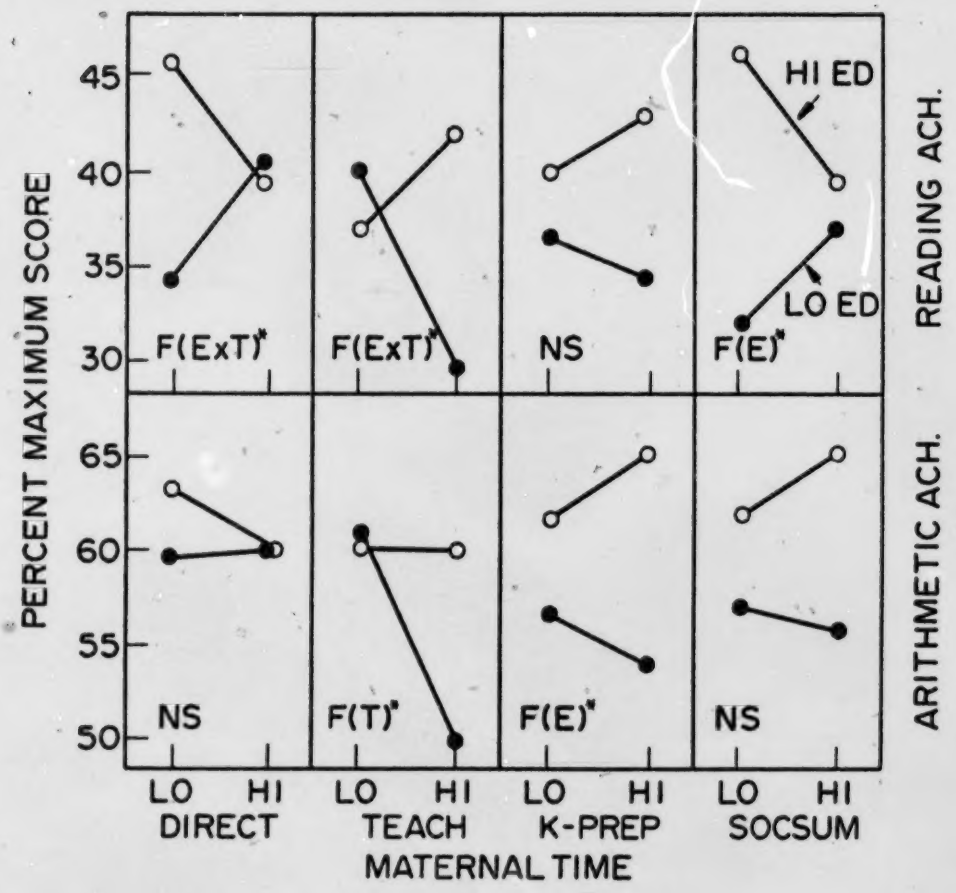

MEAN HOURS PER WEEK
45
40
35
30
25
20
15
10
σ_M
F=8.40; p<.01
Indirect
F=6.81; p<.01
Available
F=7.76; p<.01
School Hours
0
0-25
25-40
MOTHER'S WEEKLY WORK HOURS

FIGURE 5


PERCENT MAXIMUM SCORE
45
40
35
30
65
60
55
50
F(ExT)*
F(ExT)*
NS
F(E)*
NS
F(T)*
F(E)*
NS
HI ED
LO ED
READING ACH.
ARITHMETIC ACH.
LO HI
DIRECT
LO HI
TEACH
LO HI
K-PREP
LO HI
SOCSUM
MATERNAL TIME